

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 579 200 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
29.12.1997 Bulletin 1997/52

(51) Int. Cl.⁶: **B65D 6/16**, B65D 6/10,
B65D 6/02, G11B 23/027,
G11B 23/03

(21) Application number: **93111281.7**

(22) Date of filing: **14.07.1993**

(54) Reusable, two-piece storage container

Wiederverwendbarer, zweiteiliger Lagerbehälter

Réceptacle de stockage en deux parties réutilisable

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **17.07.1992 US 915126**
22.04.1993 US 52121

(43) Date of publication of application:
19.01.1994 Bulletin 1994/03

(60) Divisional application:
97106148.6 / 0 791 540

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• **SOVIET PATENT ABSTRACTS Section PQ, Week**
9340 Derwent Publications Ltd., London, GB;
Class Q32, AN 93-318811 & SU-A-1 765 059 (
CHERNORECHENSKOE KORUND PRODN
ASSOC) , 30 September 1992

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Description

The present invention relates to storage and shipping containers. More particularly, the present invention relates to recyclable and reusable storage and shipping containers having a simple construction.

In producing magnetic recording media, there is a recurring need to transport large quantities of recording tape from the point of tape manufacture to other locations for final loading into cassettes, cartridges, or other carriers. It is common to transport the tape in the form of relatively large rolls, called pancakes. A pancake of 1.27 cm (0.5 in) wide tape is typically wound on a hollow annular core having an outer diameter of 11.4 cm (4.5 in), and a width of 1.8 cm (0.7 in), slightly larger than the width of the tape. The outer diameter of the pancakes is typically about 35.6-40.7 cm (14-16 in). Shipping these tape pancakes over long distances under conditions of mechanical shock and vibration requires that they be well supported.

One primary form of damage to pancakes is axial shifting of the layers of tape relative to the pancake such that the pancake is no longer flat. This shifting, called core drop, hub drop, popped strands, or tape shift, can be caused by a stack of pancakes being dropped on a hard floor or being transported over rough or bumpy surfaces. Other problems and damage caused with known pancake containers include the offsetting of a portion of the pancake, called "upset," rotation of the core relative to the pancake, and transfer of cushion adhesive to the tape.

While effective protection of the tape in the pancake stacks is essential, the magnetic tape market is very price-competitive. Thus, protective packaging must be low cost, both in the packaging material itself, and in the labor required to apply and remove the packaging. It is also desirable to minimize the amount of packaging waste material which is discarded.

Known methods of protecting pancakes during shipping generally involve sliding several pancakes over a shaft or hollow tube, placing resilient spacers between each pancake, and placing a solid end plate on the top and bottom of the stack. The stack can be held together by shrink wrap film, as disclosed in U.S.-A-4,955,471. However, the application and removal of shrink wrap film is very labor-intensive. Removal can involve cutting or other operations which can damage the pancake and generate waste which can contaminate the tape. Also, shrink wrap is not reusable, thereby increasing costs and waste.

The shrink wrap removal problem is addressed in U.S.-A-4,708,246. This publication discloses grooves in the outer surface of the package to allow a knife to cut the shrink wrap without contacting the inner packaging material. This is accomplished by running the knife along the groove, without penetrating beyond the depth of the groove as the shrink wrap is cut.

U.S.-A-4,883,178 eliminates shrink wrap. This pat-

ent discloses holding the stack together with a threaded member running coaxially along the center of the stack, and a nut which tightens on an end plate. The compression is created by the threaded member being disposed within the pancake cores. This method is less labor intensive than shrink wrap, but it does not enclose the stack, so that additional wrapping may still be required.

U.S.-A-4,708,246 discloses spacers and other packaging features which improve compression control. However, sometimes spacers move during shipping and can generate debris. Also, some spacer materials can create static which attracts debris to the pancakes.

Radially expanding mandrels are also known. U.S.-A-4,124,173 discloses an inflatable tube inside of an expandable mandrel. Cam mechanisms which press cylinder segments outwardly when a central shaft rotates relative to the outer segments are also known. U.S.-A-4,516,786 discloses a rotatable core chuck and U.S.-A-4,730,779 discloses an expanding assembly for a web-coiling core.

U.S.-A-5,094,346 assigned to Minnesota Mining and Manufacturing Company stacks pancakes on a mandrel within a container. The container includes a base, at least one mandrel extending from the base on which pancakes can be placed, and a cover which encloses the pancakes. The cover has an internal space shaped to approximate the shape and size of a plurality of pancakes. The mandrel could radially expand to secure the pancakes and/or the pancakes could be secured by axial pressure.

U.S.-A-4,002,287 discloses a container blank and a container for shipping items such as cakes. The container is formed of two sections. Each section is rectangular and is foldable to separate the section into three sectors. The adjacent sectors can be oriented at right angles to each other to form a U. The storage container is formed by folding one section into a U, folding the other section into an upside down U, and mating the two sections so that the side edges of the wing sectors of the U on one section are disposed adjacent the side edges of the wing sectors of the other U to form the storage container edges. The two sections are secured together by hooks.

Living hinges which snap into an open or closed configuration for use with containers are disclosed in US-A-5,054,643 and US-A-4,726,091.

It is the object of the present invention to provide a parallel-epipedal storage container which can be easily manufactured and has a stable overall-construction when assembled.

According to the invention this object is solved by means of a container as defined in accompanying claims 1 and 8, respectively.

A parallelepipedal storage container is formed of two substantially identical sections. Each section is rectangular and is foldable to separate the section into a central base wall and two side walls. The adjacent base and side walls can be oriented at right angles to each

other. The storage container is formed by folding one section, folding the other section, and mating the two sections so that the side edges of the side walls of one section are disposed adjacent the side edges of the side walls of the other section to form edges of the storage container. The two sections are secured together to form the container. Each section is foldable along two parallel lines which separate the section into the central base wall and two side walls. The two sections are biased along the parallel lines to allow the sections to be flat or bent at right angles.

The two sections are secured together. Each edge of each side wall has a first edge guide extending along a part of the length of the edge adjacent the base wall at a substantially right angle with the side wall. The first edge guide defines a groove. A first edge of the side wall is complementary in shape to the groove and is received in the groove when the sections are mated. A second angled edge is formed on the free end of each side wall and is received in a complementary-shaped second edge guide extending along the side edge of the adjacent base wall.

The container can include a plurality of stacking devices formed on both the inner and outer surfaces of the base walls to permit several containers to be stacked, interlocked, and secured from relative lateral motion both when the containers are disassembled and broken down for flat storage as well as when the containers are assembled as complete containers.

The sections are formed as flat sections using a molded plastic material. Living hinges are formed along the parallel lines. The container is blow-molded and is reusable many times. The sections are formed of substantially a single material so that the storage container is recyclable into additional containers.

Each section of the storage container includes a system for securing a plurality of disk-shaped articles having a central opening, such as tape pancakes. A receptacle is formed in the base wall of the section, and a support on which the pancakes can be mounted is receivable within the receptacle. The side walls can be curved and shaped to approximate the shape of the pancakes to provide a close fit between the stored pancakes and the walls of the container.

In an alternative embodiment, the side walls are relatively short, and side panels interlock with the free end of the side walls to form the container side walls. Several side panels having different lengths can be used to form a container having different volumes. The side panels interlock with the free end of the side walls using interlocking detents.

The invention will be explained in more detail referring to preferred embodiments described hereinbelow and shown in the drawing in which:

Figure 1 is a perspective view of an assembled container according to one embodiment of the present invention.

Figure 2 is a perspective view of the first section of the container of Figure 1 with the first section flat and showing the baffled core support.

Figure 3 is a perspective view of the first section of Figure 2 showing tape pancakes loaded on the baffled core support and also showing the interior rod. Figure 4 is a perspective view of the first section of Figure 3 with the interior rod in place within the baffled core support and the sides of the first section bent at 90° angles.

Figure 5 is a perspective view of the container of Figure 1 with the second section being placed on the first section.

Figure 6 is a cross-sectional view of the container taken through line 6-6 of Figure 1.

Figure 7 is an enlarged perspective view of the system for connecting the sections of the container.

Figure 8 is a partial cross-sectional view of a system of maintaining a section in position.

Figures 9A, 9B, and 9C are top views of the sections of a container according to another embodiment of the present invention.

Figure 10 is a perspective view of a container according to another embodiment of the present invention.

Figure 11 is a perspective view of a section of a modified version of the container of Figure 10.

Figure 12 is a cross-sectional view of the container taken along line 12-12 of Figure 10.

Figure 13 is a cross-sectional view of the container taken along line 13-13 of Figure 10.

Figure 14 is a cross-sectional view of the container taken along line 14-14 of Figure 11.

Figures 1-6 and 10 illustrate the container 10 according to one embodiment of the present invention. The container 10 is used for pancakes 88 of recording tape, each of which includes a quantity of tape wound around a flangeless hub or core which extends approximately 0.25 cm (0.1 in) on each side of the tape. The container 10 includes a base, a mandrel extending from the base on which a plurality of pancakes can be placed, and a cover which combines with the base to completely enclose the pancakes.

A thin spacer can be disposed between adjacent pancakes on each mandrel to prevent the adjacent cores from contacting each other and to prevent "hub dusting" which creates debris. End pads or bushings can be placed on the walls of the base to space the pancakes from the wall, maintain constant axial pressure on the pancakes, and prevent damage to the adjacent pancake due to contact with the wall if the wall bows and contacts the pancake nonuniformly. However, it is preferred that no pads and no spacers be used. The peripheral edges of the pancakes are completely exposed to allow them to be grasped symmetrically to reduce the effort needed to remove the pancakes from the mandrel. This reduces the risk of damage to the

pancakes and injury to workers.

As best shown in Figures 2, 3, 4, and 5, the parallelepipedal storage container 10 is formed of substantially identical first and second sections 12, 14. Each section 12, 14 is rectangular. The first section 12 is foldable to separate the section into a central base wall 16 and two side walls 18, 20. The second section 14 is foldable to separate the section into a central base wall 22 and two side walls 24, 26. The adjacent base and side walls 16, 18, 20 and 22, 24, 26 can be oriented at right angles to each other to form a U. The storage container 10 is formed by folding the first section 12 into a U, folding a second section 14 into a U, turning the second section 14 upside down and rotating it 90° with respect to the first section 12, and mating the two sections 12, 14 so that the side edges 28 of the side walls 18, 20 of the U on the first section 12 are disposed adjacent the side edges 28 of the side walls 24, 26 of the U on the second section 14 to form edges of the storage container 10. The two sections 12, 14 are secured together to form the container 10.

Each section 12, 14 is foldable along two parallel lines 30, 32 and 34, 36 which separate the section into the central base wall 16, 22 and the two side walls 18, 20, 24, 26, respectively. The two sections 12, 14 are biased along the parallel fold lines 30, 32, 34, 36 to allow the sections to rest either flat or bent at right angles. Alternatively, separate locking latches or similar devices can be used to hold the side walls 18, 20, 24, 26 perpendicular to the respective base walls 16, 22. The two sections 12, 14 are secured together using a tongue and groove type connection, best shown in Figures 5 and 7, to mate the sections 12, 14 along respective edges.

A tongue and a groove type connection is mounted on each side wall edge 28 to mate with a respective connection on the adjacent side wall edge 28 when the sections 12, 14 are mated. Each edge 28 of each side wall 16, 18, 24, 26 includes an edge guide 38 extending along a part of the length of the edge 28 adjacent the base wall 16, 22. The edge guide 38 extends at a substantially right angle with the respective side wall 18, 20, 24, 26 and extends toward the inside of the container 10. The portion of the edge 28 adjacent the free end 40 of each side wall 18, 20, 24, 26 has a cutout portion 42 with an angled edge 46 that is complementary to that formed by the edge guide 38 and the side wall 28. The cutout portion 42 receives a respective edge guide 38 on a respective side wall of the other section when the sections 12, 14 are mated while the edge guide 38 of one side wall on one of the sections receives a corresponding length of the angled edge 46 of the edge 28 adjacent the free end 40 of the adjacent side wall on the other section.

Additionally, the free end 40 of each side wall 18, 20, 24, 26 has an angled edge 46 extending for most of its entire length. This angled edge 46 is received in a complementary-shaped groove formed by an edge

guide 38 extending along a part of the length of the side edge 48 of the adjacent base wall 16, 22. The edge guide 38 extends at a substantially right angle with the respective base wall 16, 22 and extends toward the inside of the container 10.

The edge guides 38 and the angled edges 46 can each extend for approximately one third of the length of the side wall edges 28 as shown in the figures. The central third of the length of the side wall edges 28 can simply abut or can be formed complementarily to improve the dust seal provided by the container 10, as shown in Figure 7. In Figure 7, the central third of the length of the side wall edges 28 is divided in half with one half of the edge having a triangular rib 50 and the other half having a complementary triangular slot 51. Corresponding ribs 50 mate with corresponding slots 51 on respective side wall edges when the sections 12, 14 are mated to form the container 10. Alternatively, the edge guides 38 and the angled edges 46 can extend for substantially half of the length of the side wall edges 28.

The container 10 seals out dust and other contaminants. Detents could be molded into the section walls to provide a dimple and cavity lock in addition to the tongue and groove connection. Additionally, latches 52 can be integrally molded as one piece with the container sections and used to further secure the sections together. These latches 52 can be centrally located at the free end 40 of each side wall 18, 20, 24, 26 and at the central portion of the base wall edges, as shown in the figures. Additional latches can be formed in the central area between the edge guide 38 and the angled edge 46 on the side edges 28.

As shown in Figure 2, the sections 12, 14 are formed as flat sections using a molded plastic material. The inner surfaces 54 of the side walls 18, 20, 24, 26 can include a curved portion 56 shaped to approximate the shape of the pancakes to provide a close fit between the stored pancakes and the walls of the container 10. Living hinges 57 are formed along the fold lines 30, 32, 34, 36. The living hinges 57 are arced or curved hinges which are biased in either a flat 180° (Figures 2 and 3) orientation or in a 90° orientation (Figures 4 and 5).

Alternatively, the side walls 18, 20, 24, 26 can be retained in the 90° orientation with the respective base walls 16, 22 using a tab 58 and slot 59 located adjacent the fold lines 30, 32, 34, 36 of the sections 12, 14 as shown in Figure 8. The tab 58 is located on the beveled side of one of the side wall and the base wall and the slot 59 is located on the beveled side of the other of the side wall and the base wall. As shown, the tab 58 is on the base wall 16, 22 and the slot is on the side walls, 18, 20, 22, 24. The tab 58 and slot 59 can extend for substantially the entire length of the beveled side of the side and base walls or can be discrete segments. Alternatively, a similar locking arrangement can be located on the base and side walls adjacent the beveled edges and on the inner surfaces 54, 55 of the side and base walls.

The container 10 is blow-molded flat using simple

tooling at low cost. Blow-molding uses a double wall construction and is reusable many times. Alternatively, the sections 12, 14 can be made by injection molding, twin-sheet thermoforming, and other methods. The sections can be made from high density polyethylene to create strong, lightweight, hollow shells. The double wall construction causes the box to collapse from the outside when subject to forces, rather than collapsing from the inside due to shifting of the core support as is likely with a single wall construction. This better protects the contents. Due to the configuration of the edge guides 38, the container 10 can not explode on impact. The only way to break open the container is to implode it. Tests have shown the container to withstand forces of 7560 N (1700 lbs). Moreover, the contents of the container will prevent implosion.

The sections 12, 14 are formed of substantially a single material so that the storage container 10 is easily recyclable into new containers. Alternatively, the sections can be lined with an insulating foam such as polyurethane to prevent wide temperature variations within the container 10 and prevent core drop resulting from temperature changes.

Each section 12, 14 of the storage container 10 includes a system 60 for securing a plurality of disk-shaped articles having a central opening, such as tape pancakes. A receptacle 62 is formed in the base wall 16, 22 of each section 12, 14, and a support 64 on which the pancakes can be mounted has its ends receivable within a respective receptacle 62. The receptacle 62 can have planar walls as shown to enhance the engagement of the support 64 within the receptacle. The support 64 can be made of material having a suitable strength-to-weight ratio such as any strong, lightweight material such as high density polyethylene or rigid polyvinyl chloride without high lubricity to enable frictional locking of the pancakes.

The support 64 is a spindle or mandrel which is isolated vibrationally from the container sections. The support can move independently of the remainder of the container 10 to absorb shocks and protect the stored pancakes. The support 64, and therefore the pancakes, is isolated by from vibration in part by the double wall construction which enables independent movement of the inner wall from the outer wall as well as independent movement of the portion of one wall on one side of the support 64 from the portion of the wall on another side of the support. As shown in Figure 6, the inner surface 118 of the base wall 22 and the outer surface 122 of the base wall 22 are formed with U-shaped grooves 84, 86. The grooves 84, 86 approximately face each other and permit the inner surface 118 to move independently from the outer surface 122. Thus, the grooves 84, 86 can move back and forth to absorb shock and protect tape pancakes 88 mounted on the support system 60.

Referring to Figures 2, 3, and 6, the support 64 is formed of two primary components, a baffled core support 66 with a head 67 and an interior rod 68 with a head

70. The heads 67, 70 fit within respective receptacles 62 in the first and second sections 12, 14. The noncircular shape of the heads 67, 70 fit within the receptacles 62 and prevent rotation of the support 64 after the container 10 is assembled. The interior rod 68 fits within the core support 66. These two components can be formed by blow molding a single spindle and cutting the spindle to form the core support 66 and interior rod 68. The baffles 72 can be ribs with some of the baffles extending completely around the core support 66 and others broken. The baffle 72 dimensions are selected to permit two pancakes to share a baffle peak 74 when the pancakes are mounted on the core support 66. Thus, each baffle peak 74 will support two adjacent pancake halves.

A nub 76 on the inside surface 78 of the core support 66 engages a spiral groove 80 on the outside surface 82 of the interior rod 68 to provide a threaded engagement between the interior rod 68 and the core support 66. The interior rod 68 can be hand turned and tightened without tools. Other modifications of a threaded engagement between the core support 24 and the interior rod 26 also could be used.

Rotation of the interior rod 68 within the core support 66 after the nub 76 engages the groove 80, moves the interior rod 68 toward the pancake stack. Further rotation after the head 70 of the interior rod 68 contacts the end of the core support 66 provides an axial compression load onto the core support 66 and therefore onto the pancake cores to hold together the pancakes. This axial compression expands the baffles 72. As the baffles 72 expand they contact and tighten against the inside of the tape pancake cores and provide a radial force to secure the pancakes in place.

As shown in Figure 6, the interior rod head 70 compresses the pancakes on the support 64 by applying a load on substantially only the pancake cores. By eliminating pressure on the tape itself, there is no pressure on the tape to force the tape off of the core and cause core drop. The load can be applied to substantially only the outer race of the cores to avoid tipping the pancake on the mandrel due to the lack of contact surface area caused by the clearance between the pancake core and the mandrel. This can be accomplished by forming the inner race of the core of a smaller axial length than the outer race. Alternatively, this can be accomplished by forming the portion of the interior rod head that is disposed adjacent the inner race of the core of a smaller axial length than the radially outer portions of the head that is disposed adjacent and against the outer race of the core.

In another embodiment shown in Figures 9A, 9B, 9C, a container can be formed with first and second sections such as section 12' in which the side walls 18', 20' are relatively short. Additional side panels 112 interlock with the free end 40' of the side walls to form the container side walls. Several side panels 112 having different lengths, as shown in Figures 9B and 9C, can be

used to form a container having different volumes. The side panels 112 interlock with the free end 40' of the side walls using interlocking detents 114. As shown, the detents 114 are located in the central portion of the free ends 40' although the detents 114 can be located on each side of the free ends 40'. The side panels 112 are detached from the side walls 18', 20' by bending the connection sufficiently to unlatch the detents. Alternatively, containers of any size can be formed by simply varying the size of the first and second sections. For example, containers having walls the size of a pallet can be used.

All embodiments of this container 10, 10' can have several buttons 116 formed on the inner surface 118 of the base walls 16, 22. These buttons 116 are receivable within complementarily-shaped indents 120 in the outer surface 122 of adjacent base walls 16, 22 when sections 12, 14 are stacked for storage or shipping. This feature can be used when the containers are broken down in the flat configuration. Similar stacking buttons 116 can be formed on the outer surface 122 of the base walls 16, 22 to permit the containers 10 to be stacked as boxes. Alternatively, the buttons 116 can be formed on the outer surface 122 of the base wall with the indents 120 formed on the inner wall 118. Additionally, handles 124 can be molded into the base walls 16, 22 along each edge of the base walls to facilitate carrying the container 10.

One improvement on the stacking buttons is to place two stacking buttons 116 at opposite corners of the inner surface 116 and two indents 120 at the other two corners of the inner surface. Two indents 120 are placed on the outer surface 122 opposite the inner surface stacking buttons. Two stacking buttons 116 are placed on the outer surface 122 opposite the inner surface indents 120. This configuration permits one set of buttons and indents to be used to enable stacking both when the containers are broken down as well as when the containers are stacked as boxes. One drawback of this configuration is that the containers do not rest flat on a smooth surface and can tend to tip due to the placement of stacking buttons 116 at only two opposing corners.

An improvement on the stacking buttons enables several containers to be stacked, interlocked, and secured from relative lateral motion both when the containers are disassembled and broken down for flat storage as well as when the containers are assembled as complete containers. This improvement also prevents tipping and includes forming stacking devices 130 which are not located on the diagonal of the base walls of the container. In connection with the container of Figures 10 to 14 comprising identical first and second sections the latter being divided into two identical subsections, these features are shown as a series of four mating outer ribs 132, outer slots 134, inner ribs 136, and inner slots 138, although more or fewer ribs and slots and other complementary-shaped configurations can be

used.

This stacking system requires the ribs 132 to be located adjacent one corner of the base wall off of the diagonal on the outer surface 122 of the wall. The slots 134 are located adjacent the same corner on the other side of the diagonal on the outer surface 122. Particularly to minimize the total volume of stacked disassembled sections if the perimeter of the entire sections is not square, slots 138 are located on the inner surface 118 of the wall directly beneath the ribs 132 and ribs 136 are located on the inner surface 118 directly beneath the slots 134. For example, as shown in the cross sections of Figures 12 and 13, where the ribs 132 are located on the outer surface 122 of the wall, slots 138 are located directly opposite the ribs 132 on the inner surface 118 of the wall. Ribs 132, 136 and slots 134, 138 can be located around only one corner, two adjacent corners, to opposite corners, three corners, or all four corners. The ribs 132, 136 and slots 134, 138 can extend along the entire side of the wall or for a short distance around the diagonal. If the ribs 132, 136 and slots 134, 138 extend for only a short distance, and are located around more than one corner, the stacking device 130 along one side for two corners can both be ribs, both be slots, or can be one of each. This is true regardless of whether the stacking device 130 is located around opposite or adjacent corners. It is also envisioned that slots 138 can be located along only two opposite sides of the inner surface 118 of the wall while ribs and slots are located along all four sides of the outer surface 122 of the wall as shown in Figure 11.

During stacking of unassembled, flat sections such as sections 12 or 90, the sections are simply stacked on top of each other with the outer surface 122 of one section disposed against the inner surface 118 of an adjacent section and with the side walls 18, 98 corresponding to each other and the base walls 16 or base wall halves 94 corresponding to each other. During stacking of assembled containers where the ribs 132, 136 and slots 134, 138 extend along all four sides, a container must be rotated 90° before stacking on another container.

Rib and slot combinations can be grouped around one corner, all corners, or any number of corners. The ribs can but need not extend for the entire width of the base wall. The ribs and slots can be formed, machined, molded, or connected in any other way to the sections.

When used for shipping pancakes, the container is molded flat as sections and is assembled into a container around a stack of pancakes by a distributor. The container is shipped to a customer who opens the container, removes the pancakes, and folds the container sections flat. The flat sections are then shipped back to the distributor for refilling and reuse. Containers are expected to last for approximately 15 cycles when made of high density polyethylene. The containers can be shipped with the support 64 horizontal and the base walls 16, 22 vertical and the receptacle 62 can be bub-

bled outwardly to prevent stacking with the support 64 vertical. Shipping with the base walls 16, 22 horizontal is also satisfactory.

This container meets many customer, social, and environmental needs. The cost of the container is less than currently used corrugated cardboard containers and the container requires less labor to unpack. The container requires less storage space than current containers both when the container is set up and when it is unfolded. The container fits into current material handling systems and can be marked easily to identify the contents. Less waste is generated during the manufacture and use of this container and the container is stackable on pallets. Moreover, the container does not damage pancakes and the stored pancakes are free from external debris from the container as the container does not generate debris. The container is safe and easy to open. The container is environmentally sound in that it is refillable, reusable, and recyclable. An appropriate material selection would permit regrinding and simple recycling of damaged or worn containers.

The system for applying a compression load on pancakes stored on a mandrel can be used in other systems in which one or more objects having a through opening are stored on a mandrel or spindle and the objects are held in place using axial and/or radial compression. Neither the objects nor the mandrel need be cylindrical.

Various changes and modifications may be made in the invention without departing from the scope of the claims. Although the walls 16, 22, 94, 96 of the sections 12, 14, 90, 92 are described as base walls, any of the walls could serve as the base, top, or side walls. The description of the walls as base, top, or side corresponds to the illustrated embodiments and these descriptions in the claims is not intended to limit the orientation at which the containers can be used. Additionally, sections can be formed with portions of four side walls adjacent the base wall of a section. Preferably, two opposing side walls are longer than the other two opposing side walls.

Claims

1. Parallelepipedal storage container comprising first and second sections (12,14), wherein each section (12,14) is rectangular and is foldable into a central base wall (16,22) and two adjacent side walls (18,20,24,26) which can be oriented at right angles to the base wall to form a U shape, wherein each side wall (18) has an end adjacent the base wall (16,22) and a free end opposite the end adjacent the base wall (16,22), and wherein the storage container is formed by folding the first section (12) into a U shape, folding the second section (14) into a U shape, turning the second section upside down and rotating the second section (14) 90° with respect to the first section (12), and mating the two sections

(12,14) so that the side edges (28) of the side walls (18,20,24,26) of the U shape on one section (12;14) are disposed adjacent the side edges (28) of the side walls of the other U shape to form edges (28) of the storage container, and means, formed integrally as one piece with the sections (12,14), for securing the two sections together along respective edges (28) to form the container, characterized in that the first and second sections are identical and the securing means comprises a first edge guide (38) extending along a part of the length of each edge (28) of each side wall (18,20,24,26) adjacent the base wall (16,22) at the substantially right angle with the side wall (18,20,24,26), wherein the first edge guide (38) defines a groove, and wherein the first edge guide groove of one side wall (18,20,24,26) on one of the sections (12,14) receives the respective portion of the edge (28) adjacent the free end of the adjacent side wall (18,20,24,26) on the other section (12,14).

2. Container according to claim 1 characterized in that the securing means further comprises

- a first edge (28) of each side wall (18,20,24,26), wherein the first edge (28) is complementary in shape to the groove formed between the first edge guide (38) and the edge (28) of the side wall, and wherein the first edge (28) is formed in part by a cutout portion (42), wherein the cutout portion of the first section receives a respective first edge guide on a respective side wall of the second section and wherein the cutout portion of the second section receives a respective first edge guide on a respective side wall of the first section, and wherein the first edge guide groove of one side wall on one of the sections receives the respective portion of the first edge adjacent the free end of the adjacent side wall on the other section, and
- a second edge (28) formed on the free end (40) of each side wall (18,20,24,26) and a second edge guide (38) extending along the side edge (28) of the adjacent base wall (16,22) at a substantially right angle with the base wall, wherein the second edge guide defines a groove complementary in shape to the second edge, and wherein the second edge is received in the respective second edge guide groove of one base wall.

3. Container according to claim 2 characterized in that the first edge guides (38) and the first edges (28) each extend for approximately one third of the length of the side wall edges (28), wherein the central third of the length of the side wall edges is formed with structure to permit respective adjacent side wall edges to complementarily engage to

assist sealing the container, and wherein the central third of the length of the side wall edges is divided in half with one half of each edge having a triangular rib (50) and the other half having a complementary triangular slot (51).

4. Container according to any one of claims 1 to 3 characterized in that there is provided a plurality of buttons (116) formed on the inside wall (118) of the base walls (16,22) and a corresponding number of complementarily-shaped indents (120) formed in the outside wall (122) of the base walls, wherein the buttons (116) are receivable within the indents of adjacent base walls (16,22) when sections (12, 14) are stacked.
5. Container according to any one of claims 1 to 3 characterized in that there is provided a plurality of buttons (116) formed on the outside wall (122) of the base walls (16,22) and a corresponding number of complementarily-shaped indents (120) formed in the inside wall (118) of the base walls (16,22), wherein the buttons (116) are receivable within the indents of adjacent base walls (16,22) when sections (12,14) are stacked.
6. Container according to any one of claims 1 to 3 characterized in that each section (12,14) is foldable along two parallel lines (30,32,34,36) which separate the section into the central base wall (16,22) and two side walls (18,20,24,26), and that there is provided a means for maintaining the side walls of each section perpendicular to the respective base wall without relying on a plurality of side walls supporting each other, wherein the maintaining means comprises means (5,59) for biasing the two sections along the parallel lines to allow the sections to be flat or bent at right angles.
7. Container according to any one of claims 1 to 6 characterized in that each section (12,14) comprises means (60) for securing a plurality of disk-shaped articles (88) having a central opening wherein the securing means comprises a receptacle (62) formed in the base wall (16,22) of the section, wherein the securing means further comprises a support (64) on which disk-shaped articles can be mounted, wherein the support is receivable within the receptacle, wherein the sections are formed as double-walled flat sections including an inside wall and an outside wall and further comprising means for vibrationally isolating the support from the container sections, and wherein the isolating means comprises U-shaped grooves formed on at least one of the inside wall and the outside wall of the central base wall of each section which permit the inside wall to move independently from the outside wall.

8. Section for use in forming a parallelepipedal storage container (10) comprising two substantially identical sections, wherein the section is rectangular and is foldable into a central base wall (16) and two adjacent side walls (18,20) which can be oriented at right angles to the base wall to form a U shape, wherein each side wall has an end adjacent the base wall and a free end (40) opposite the end adjacent the base wall, and wherein two sections can form the storage container by folding a first section (12) into a U shape, folding a second section (12) into a U shape, turning the second section upside down and rotating the second section 90° with respect to the first section, and mating the two sections so that the side edges of the side walls of the U shape on one section are disposed adjacent the side edges of the side walls of the other U shape to form edges of the storage container, and means, formed integrally as one piece with the section, for securing two sections together along respective edges to form the container, characterized in that the securing means comprises a first edge guide (38) extending along a part of the length of each edge of each side wall adjacent the base wall at a substantially right angle with the side wall, wherein the first edge guide defines a groove, and wherein the first edge guide groove of one side wall on one section receives the respective portion of the edge adjacent the free end of the adjacent side wall on another section when the sections are mated.

Patentansprüche

1. Rechteckiger Speicherbehälter mit einem ersten und einem zweiten Abschnitt (12,14), die jeweils rechteckig ausgebildet sind und in eine zentrale Basiswand (16,22) und zwei angrenzende Seitenwände (18,20,24,26) faltbar sind, welche zur Bildung einer U-Form rechtwinklig zu der Basiswand ausgerichtet werden können, wobei jede Seitenwand (18) ein an die Basiswand (16,22) angrenzendes Ende und ein freies Ende aufweist, das dem an die Basiswand (16,22) angrenzenden Ende entgegengesetzt ist, und wobei der Speicherbehälter gebildet wird, indem der erste Abschnitt (12) in eine U-Form gebogen wird, der zweite Abschnitt (14) in eine U-Form gebogen wird, der zweite Abschnitt umgedreht wird und der zweite Abschnitt (14) in bezug auf den ersten Abschnitt (12) um 90° gedreht wird, und die beiden Abschnitte (12,14) derart passend zusammengefügt werden, daß die Seitenränder (28) der Seitenwände (18,20,24,26) der U-Form an einem Abschnitt (12;14) an den Seitenrändern (28) der Seitenwände der anderen U-Form angeordnet sind, um Ränder (28) des Speicherbehälters zu bilden, und einer einstückig an die Abschnitte (12,14) angeformten Einrichtung, um

zur Bildung des Behälters die beiden Abschnitte entlang betreffender Ränder (28) aneinander zu befestigen,

dadurch gekennzeichnet, daß der erste und der zweite Abschnitt identisch sind und die Befestigungseinrichtung eine erste Randführung (38) aufweist, die sich entlang eines an die Basiswand (16,22) angrenzenden Teiles der Länge jedes Randes (28) jeder Seitenwand (18,20,24,26) und im wesentlichen rechtwinklig zu der Seitenwand (18,20,24, 26) erstreckt, wobei die erste Randführung (38) eine Nut definiert, und wobei die erste Randführungs-Nut einer Seitenwand (18,20,24,26) eines der Abschnitte (12,14) den entsprechenden Teil des Randes (28) aufnimmt, der an dem freien Ende der angrenzenden Seitenwand (18,20,24,26) des anderen Abschnitts (12,14) ausgebildet ist.

2. Behälter nach Anspruch 1, dadurch gekennzeichnet, daß die Befestigungseinrichtung ferner aufweist:

- einen an jeder Seitenwand (18,20,24,26) ausgebildeten ersten Rand (28), dessen Form der zwischen der ersten Randführung (38) und dem Rand (28) der Seitenwand ausgebildeten Nut komplementär ist, wobei der erste Rand (28) teilweise durch einen ausgeschnittenen Bereich (42) gebildet ist, wobei der ausgeschnittene Bereich des ersten Abschnitts eine betreffende erste Randführung einer betreffenden Seitenwand des zweiten Abschnitts aufnimmt und der ausgeschnittene Bereich des zweiten Abschnitts eine betreffende erste Randführung einer betreffenden Seitenwand des ersten Abschnitts aufnimmt, und wobei die Randführungs-Nut einer Seitenwand eines der Abschnitte den entsprechenden Teil des ersten Randes aufnimmt, der an dem freien Ende der angrenzenden Seitenwand des anderen Abschnitts ausgebildet ist, und
- einen an dem freien Ende (40) jeder Seitenwand (18,20, 24,26) ausgebildeten zweiten Rand (28) und eine zweite Randführung (38), die sich entlang des Seitenrandes (28) der angrenzenden Basiswand (16,22) im wesentlichen rechtwinklig zu der Basiswand erstreckt, wobei die zweite Randführung eine Nut definiert, deren Form dem zweiten Rand komplementär ist, und wobei der zweite Rand in der betreffenden zweiten Randführungs-Nut einer Basiswand aufgenommen wird.

3. Behälter nach Anspruch 2, dadurch gekennzeichnet, daß die ersten Randführungen (38) und die ersten Ränder (28) sich jeweils über ungefähr ein Drittel der Länge der Seitenwandränder (28) erstrecken, wobei in dem mittleren Drittel der Länge

der Seitenwandränder eine Struktur ausgebildet ist, die zum Unterstützen der Abdichtung des Behälters ein komplementäres Eingreifen der betreffenden angrenzenden Seitenwandränder ermöglicht, und wobei das mittlere Drittel der Länge der Seitenwandränder in Hälften geteilt ist und dabei eine Hälfte jedes Randes eine dreieckige Rippe (50) und die andere Hälfte einen komplementären dreieckigen Spalt (51) aufweist.

4. Behälter nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß mehrere Vorsprünge (116) an der Innenwand (118) der Basiswände (16,22) und eine entsprechende Anzahl komplementär ausgebildeter Vertiefungen (120) in der Außenwand (122) der Basiswände ausgebildet sind, wobei, wenn Abschnitte (12,14) aufeinander-gestapelt werden, die Vorsprünge (116) in den Vertiefungen angrenzender Basiswände (16,22) aufgenommen werden können.

5. Behälter nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß mehrere Vorsprünge (116) an der Außenwand (122) der Basiswände (16,22) und eine entsprechende Anzahl komplementär ausgebildeter Vertiefungen (120) in der Innenwand (118) der Basiswände (16,22) ausgebildet sind, wobei, wenn Abschnitte (12,14) aufeinander-gestapelt werden, die Vorsprünge (116) in den Vertiefungen angrenzender Basiswände (16,22) aufgenommen werden können.

6. Behälter nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß jeder Abschnitt (12,14) entlang zweier paralleler Linien (30,32,34,36) faltbar ist, die den Abschnitt in die mittlere Basiswand (16,22) und die beiden Seitenwände (18,20,24,26) teilen, und daß eine Einrichtung vorgesehen ist, um die Seitenwände jedes Abschnitts senkrecht zu der betreffenden Basiswand zu halten, ohne daß dazu eine gegenseitige Stützung der mehrerer Seitenwände erforderlich ist, wobei die Aufrechterhaltungseinrichtung eine Einrichtung (5,59) aufweist, um die beiden Abschnitte entlang der parallelen Linien vorzuspannen und dadurch die flache Ausgestaltung oder rechtwinklige Biegung der Abschnitte zu ermöglichen.

7. Behälter nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß jeder Abschnitt (12,14) eine Einrichtung (60) aufweist, um mehrere mit einer zentralen Öffnung versehene plattenförmige Artikel (88) zu sichern, wobei die Sicherungseinrichtung eine in der Basiswand (16,22) des Abschnitts ausgebildete Aufnahme (62) aufweist, wobei die Sicherungseinrichtung ferner einen Support (64) aufweisen, an dem die plattenförmigen

Artikel befestigt werden können, wobei der Support innerhalb des Behälters aufgenommen werden kann, wobei die Abschnitte als doppelwandige flache Abschnitte mit einer Innenwand und einer Außenwand ausgebildet sind, und die Sicherungseinrichtung ferner eine Einrichtung zur vibrationsdämmenden Isolierung des Supports von den Behälterabschnitten aufweist, und wobei die Isolierungseinrichtung U-förmige Nuten aufweist, die mindestens an der Innenwand oder der Außenwand der zentralen Basiswand jedes Abschnitts ausgebildet sind und eine von der Außenwand unabhängige Bewegung der Innenwand ermöglichen.

8. Abschnitt zur Bildung eines rechteckigen Speicherbehälters (10) mit zwei im wesentlichen identischen Abschnitten, die rechteckig ausgebildet sind und in eine zentrale Basiswand (16) und zwei angrenzende Seitenwände (18,20) faltbar sind, welche zur Bildung einer U-Form rechtwinklig zu der Basiswand ausgerichtet werden können, wobei jede Seitenwand ein an die Basiswand angrenzendes Ende und ein freies Ende (40) aufweist, das dem an die Basiswand angrenzenden Ende entgegengesetzt ist, und wobei zwei Abschnitte den Speicherbehälter bilden können, indem ein erster Abschnitt (12) in eine U-Form gebogen wird, ein zweiter Abschnitt (12) in eine U-Form gebogen wird, der zweite Abschnitt umgedreht wird und der zweite Abschnitt in bezug auf den ersten Abschnitt um 90° gedreht wird, und die beiden Abschnitte derart passend zusammengefügt werden, daß die Seitenränder der Seitenwände der U-Form an einem Abschnitt an den Seitenrändern der Seitenwände der anderen U-Form angeordnet sind, um Ränder des Speicherbehälters zu bilden, und einer einstückig an den Abschnitt angeformten Einrichtung, um zur Bildung des Behälters die beiden Abschnitte entlang betreffender Ränder aneinander zu befestigen, dadurch gekennzeichnet, daß die Befestigungseinrichtung eine erste Randführung (38) aufweist, die sich entlang eines an die Basiswand angrenzenden Teiles der Länge jedes Randes jeder Seitenwand und im wesentlichen rechtwinklig zu der Seitenwand erstreckt, wobei die erste Randführung eine Nut definiert, und wobei die erste Randführungs-Nut einer Seitenwand eines Abschnitts den entsprechenden Teil des Randes aufnimmt, der, wenn die Abschnitte passend zusammengefügt sind, an dem freien Ende der angrenzenden Seitenwand eines anderen Abschnitts ausgebildet ist.

Revendications

1. Récipient de stockage parallélépipédique comprenant des première et deuxième sections (12, 14), dans lequel chaque section (12, 14) est rectangu-

laire et est susceptible d'être repliée pour former une paroi de base centrale (16, 22) et deux parois latérales (18, 20, 24, 26) qui peuvent être orientées perpendiculairement à la paroi de base pour former une structure en U, dans lequel chaque paroi latérale (18) a une extrémité adjacente à la paroi de base (16, 22) et une extrémité libre opposée à l'extrémité adjacente à la paroi de base (16, 22), et dans lequel le récipient de stockage est formé en pliant la première section (12) en U, en pliant la deuxième section (14) en U, en plaçant la deuxième section à l'envers et en faisant tourner la deuxième section (14) de 90° par rapport à la première section (12), et en appariant les deux sections (12, 14) de sorte que les bords latéraux (28) des parois latérales (18, 20, 24, 26) de la structure en U sur une section (12; 14) sont disposés adjacents aux bords latéraux (28) des parois latérales de l'autre structure en U pour former les bords (28) du récipient de stockage, et des moyens, faisant partie intégrante des sections (12, 14), pour fixer les deux sections ensemble le long des bords respectifs (28) pour former le récipient, caractérisé en ce que les première et deuxième sections sont identiques et en ce que les moyens de fixation comprennent un premier guide de bord (38) s'étendant le long d'une partie de la longueur de chaque bord (28) de chaque paroi latérale (18, 20, 24, 26) adjacente à la paroi de base (16, 22) sensiblement perpendiculairement à la paroi latérale (16, 18, 24, 26), dans lequel le premier guide de bord (38) définit une gorge, et dans lequel la première gorge de guidage de bord d'une paroi latérale (18, 20, 24, 26) sur une des sections (12, 14) reçoit la partie respective du bord (28) adjacent à l'extrémité libre de la paroi latérale adjacente (18, 20, 24, 26) sur l'autre section (12, 14).

2. Récipient selon la revendication 1, caractérisé en ce que les moyens de fixation comprennent en outre

- un premier bord (28) de chaque paroi latérale (18, 20, 24, 26), dans lequel le premier bord (28) est complémentaire du point de vue configuration de la gorge formée entre le premier guide de bord (38) et le bord (28) de la paroi latérale, et dans lequel le premier bord (28) est formé en partie par une portion découpée (42), dans lequel la partie découpée de la première section reçoit un premier guide de bord respectif sur une paroi latérale respective de la deuxième section et dans lequel la portion découpée de la deuxième section reçoit un premier guide de bord respectif sur une paroi latérale respective de la première section, et dans lequel la première gorge de guidage de bord d'une paroi latérale sur une des sections

reçoit la portion respective du premier bord adjacent à l'extrémité libre de la paroi latérale adjacente sur l'autre section, et

- un deuxième bord (28) formé sur l'extrémité libre (40) de chaque paroi latérale (18, 20, 24, 26) et un deuxième guide de bord (38) s'étendant le long du bord latéral (28) de la paroi de base (16, 22) adjacente, sensiblement perpendiculairement à la paroi de base, dans lequel le deuxième guide de bord définit une gorge complémentaire du point de vue configuration du deuxième bord, et dans lequel le deuxième bord est reçu dans la deuxième gorge de guidage de bord respective d'une paroi de base. 5
3. Récipient selon la revendication 2, caractérisé en ce que les premiers guides de bord (38) et les premiers bords (28) s'étendent chacun sur environ un tiers de la longueur des bords (28) des parois latérales, dans lequel le tiers central de la longueur des bords des parois latérales a une structure destinée à permettre aux bords des parois latérales adjacents respectifs de venir réciproquement en prise pour aider à réaliser l'étanchéité du récipient, et dans lequel le tiers central de la longueur des bords des parois latérales est divisé en deux moitiés, une moitié de chaque bord comportant une nervure triangulaire (50) et l'autre moitié comportant une fente triangulaire complémentaire (51). 10 20 25
4. Récipient selon l'une quelconque des revendications 1 à 3, caractérisé en ce qu'il est prévu une pluralité de boutons (116) formés sur la paroi intérieure (118) des parois de base (16, 22) et un nombre correspondant d'empreintes creuses (120) de forme complémentaire, formées dans la paroi extérieure (122) des parois de base, dans lequel les boutons (116) sont destinés à venir se loger dans les empreintes creuses des parois de base (16, 22) adjacentes lorsque les sections (12, 14) sont superposées. 30 35 40
5. Récipient selon l'une quelconque des revendications 1 à 3, caractérisé en ce qu'il est prévu une pluralité de boutons (116) formés sur la paroi extérieure (122) des parois de base (16, 22) et un nombre correspondant d'empreintes creuses (120) de forme complémentaire, formées dans la paroi intérieure (118) des parois de base (16, 22), dans lequel les boutons (116) sont destinés à venir se loger dans les empreintes creuses des parois de base (16, 22) adjacentes lorsque les sections (12, 14) sont superposées. 45 50
6. Récipient selon l'une quelconque des revendications 1 à 3, caractérisé en ce que chaque section (12, 14) est repliable le long de deux lignes parallèles (30, 32, 34, 36) qui séparent la section en une 55

paroi de base centrale (16, 22) et deux parois latérales (18, 20, 24, 26), et en ce qu'il est fourni des moyens pour maintenir les parois latérales de chaque section perpendiculaire à la paroi de base respective sans compter pour ce faire sur une pluralité de paroi latérales se supportant les unes les autres, dans lequel les moyens de maintien comprennent des moyens (5, 59) destinés à pousser les deux sections le long des lignes parallèles pour permettre aux sections d'être à plat ou pliées à angles droits.

7. Récipient selon l'une quelconque des revendications 1 à 6, caractérisé en ce que chaque section (12, 14) comprend des moyens (60) pour fixer une pluralité d'articles en forme de disque (88) comportant une ouverture centrale, dans lequel les moyens de fixation comprennent un logement (62) formé dans la paroi de base (16, 22) de la section, dans lequel les moyens de fixation comprennent en outre un support (64) sur lequel les articles en forme de disque peuvent être montés, dans lequel le support est destiné à être reçu à l'intérieur du logement, dans lequel les sections sont réalisées sous la forme de sections plates à double paroi, comprenant une paroi intérieure et une paroi extérieure, et comprenant en outre des moyens destinés à isoler de manière antivibratile le support des sections du récipient, et dans lequel les moyens d'isolement comprennent des gorges en forme de U formées sur au moins une de la paroi intérieure et de la paroi extérieure de la paroi de base centrale de chaque section, qui permettent à la paroi intérieure de bouger indépendamment de la paroi extérieure.
8. Section destinée à être utilisée pour la réalisation d'un récipient de stockage parallélépipédique (10), comprenant deux sections sensiblement identiques, dans laquelle la section est rectangulaire et est repliable pour former une paroi de base centrale (16) et deux parois adjacentes (18, 20) qui peuvent être orientées perpendiculairement à la paroi de base pour former une structure en U, dans lequel chaque paroi latérale a une extrémité adjacente à la paroi de base et une extrémité libre opposée à l'extrémité adjacente à la paroi de base, et dans lequel deux sections peuvent former le récipient de stockage en pliant une première section (12) en U, en pliant une deuxième section (12) en U, en plaçant la deuxième section à l'envers et en faisant tourner la deuxième section de 90° par rapport à la première section, et en appariant les deux sections de sorte que les bords latéraux des parois latérales de la structure en U sur une section sont disposés adjacents aux bords latéraux des parois latérales de l'autre structure en U pour former les bords du récipient de stockage, et des moyens, faisant partie intégrante de la section, pour fixer les deux sections

ensemble le long des bords respectifs pour former le récipient, caractérisée en ce que les moyens de fixation comprennent un premier guide de bord (38) s'étendant le long d'une partie de la longueur de chaque bord de chaque paroi latérale adjacente à la paroi de base sensiblement perpendiculairement à la paroi latérale, dans lequel le premier guide de bord définit une gorge, et dans lequel la première gorge de guidage de bord d'une paroi latérale sur une section reçoit la partie respective du bord adjacent à l'extrémité libre de la paroi latérale adjacente sur une autre section lorsque les sections sont appariées.

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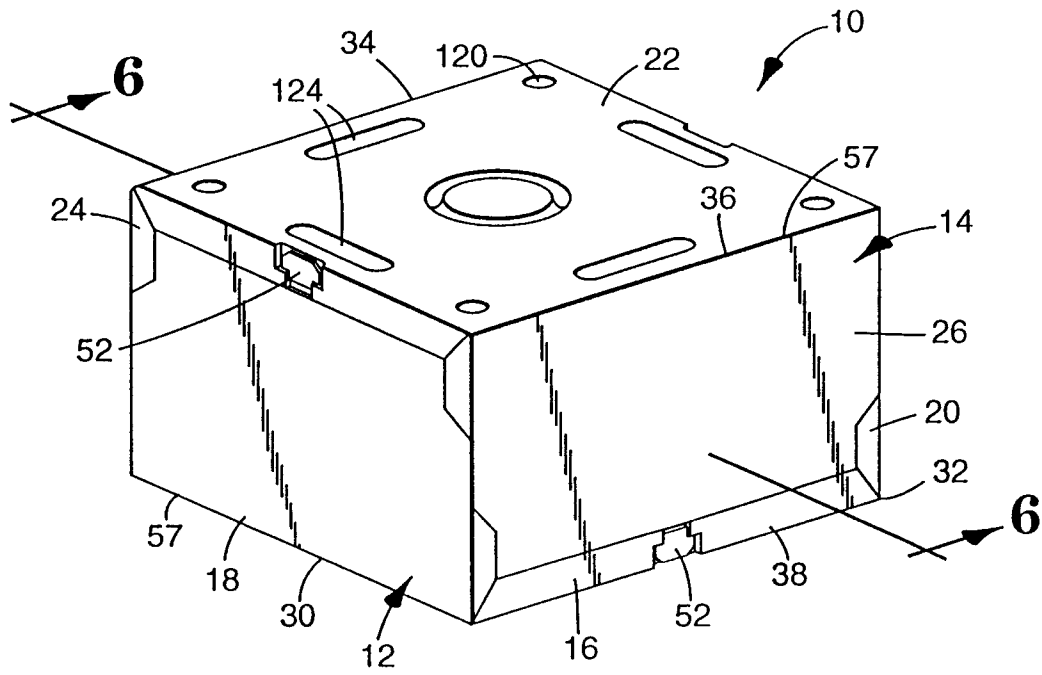


Fig. 1

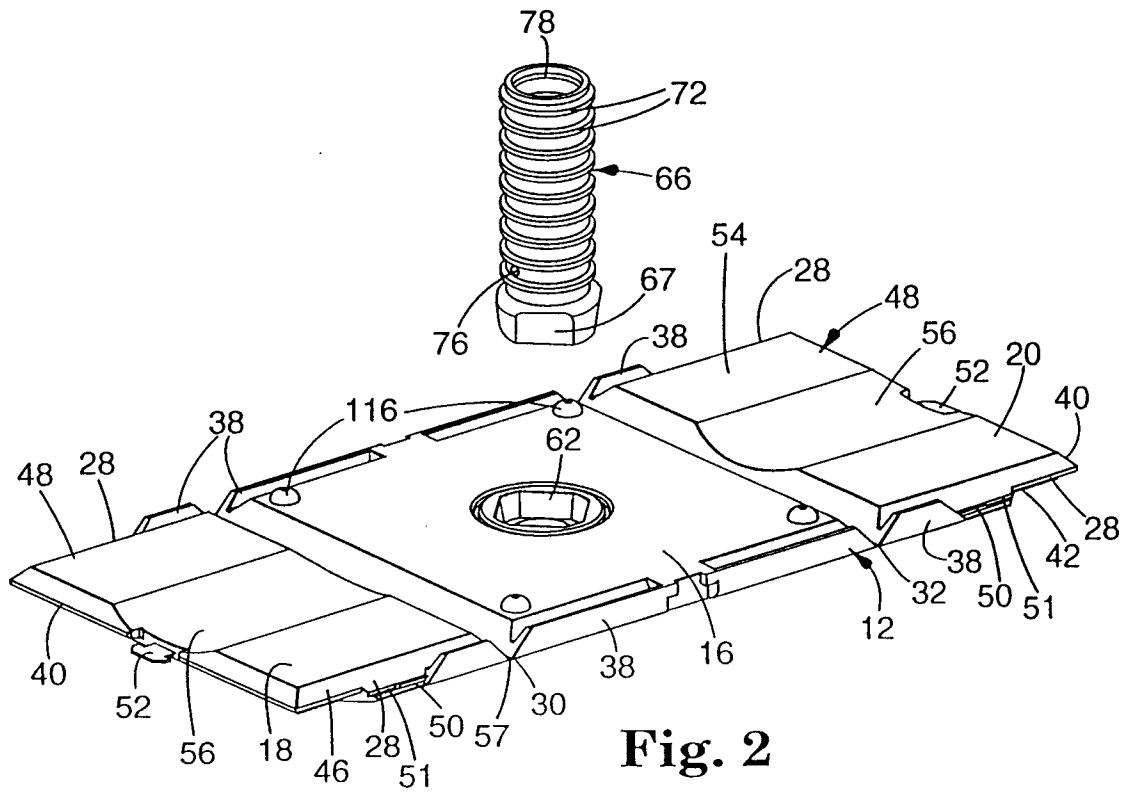


Fig. 2

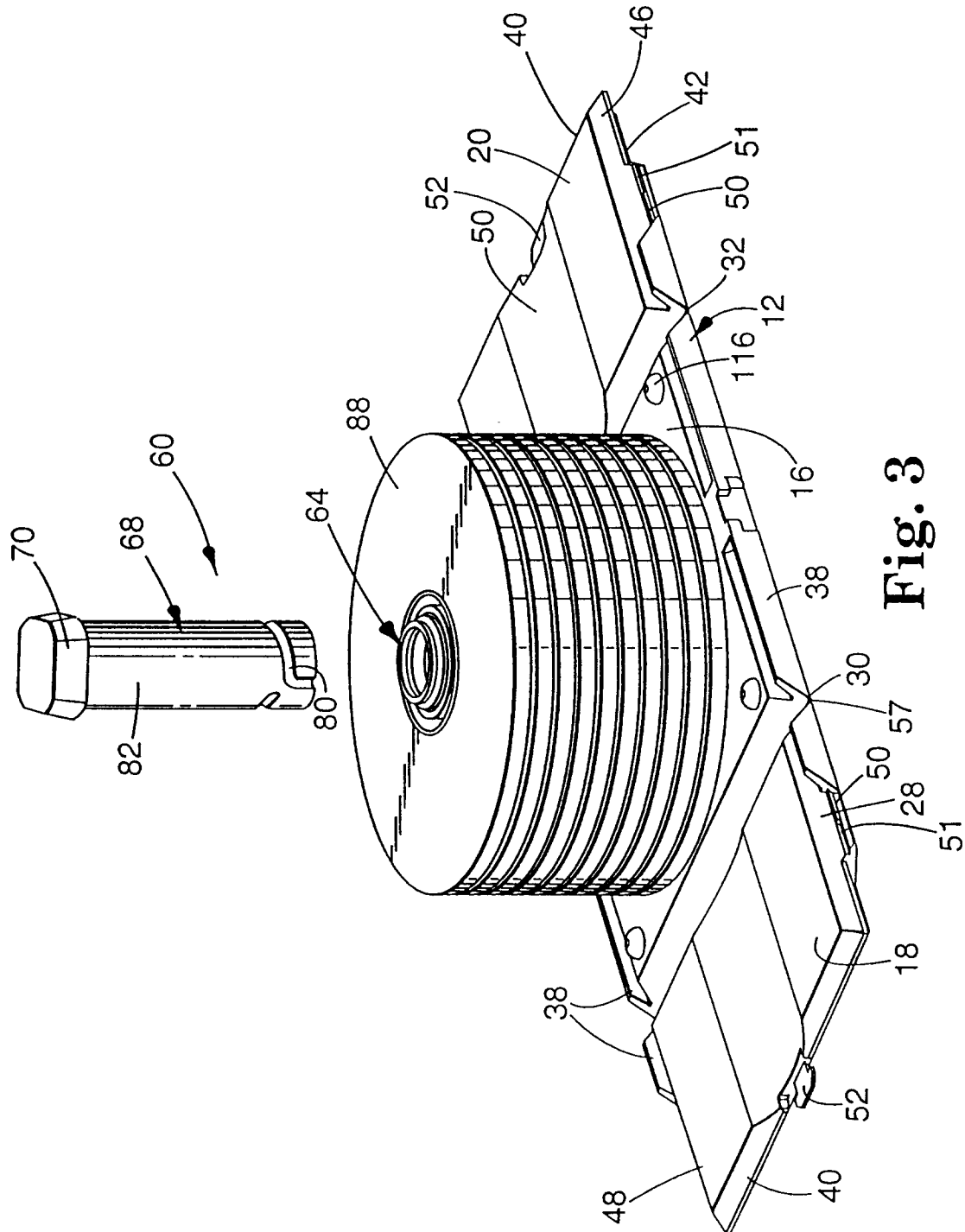
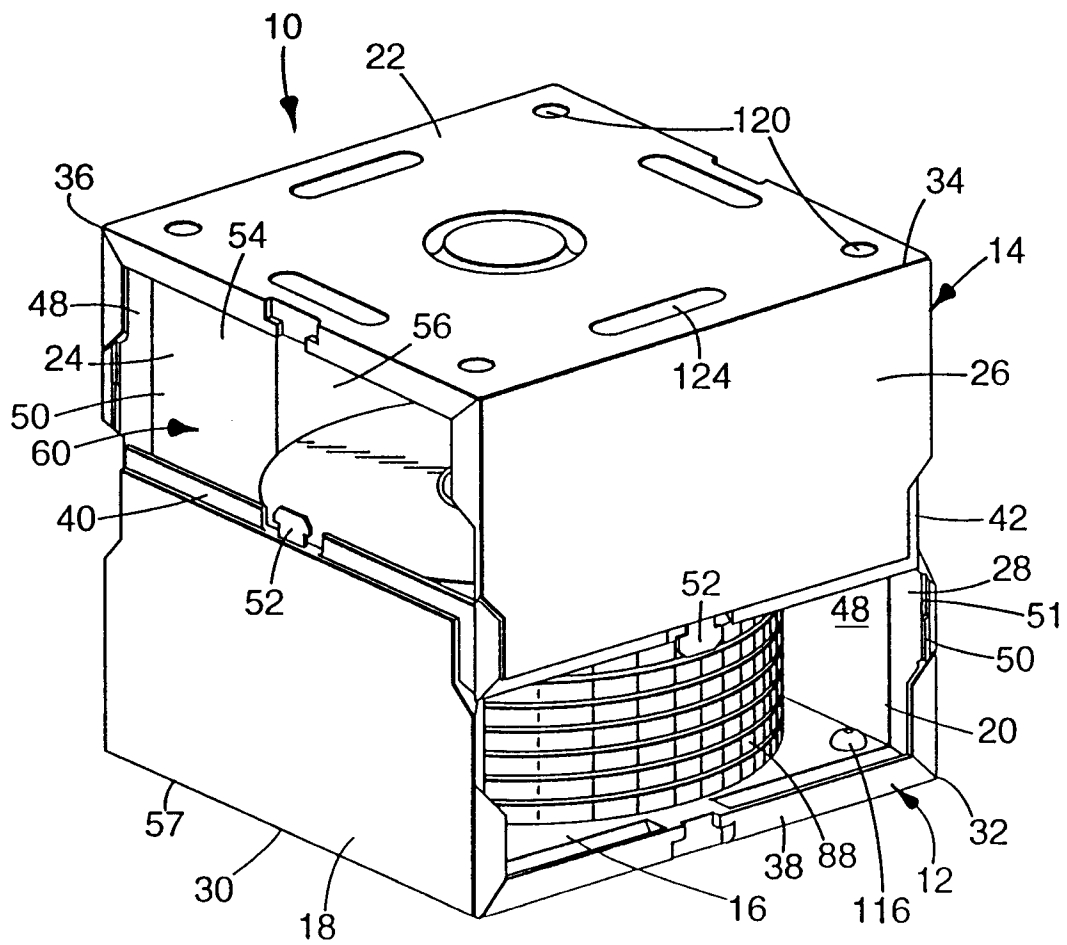
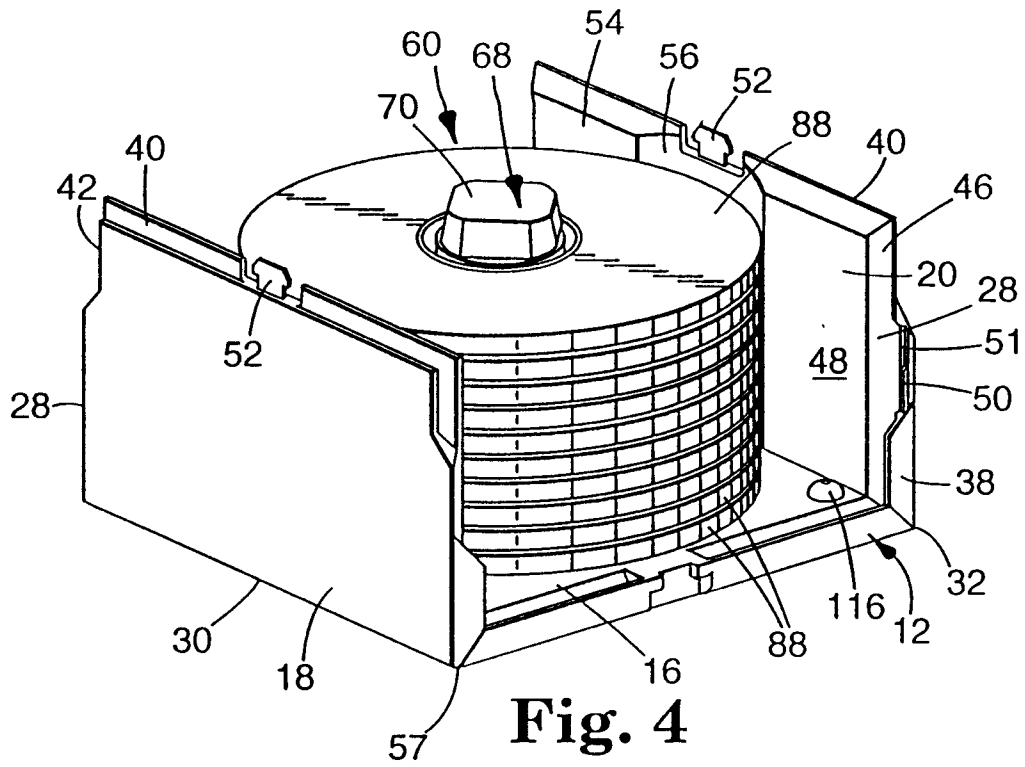


Fig. 3



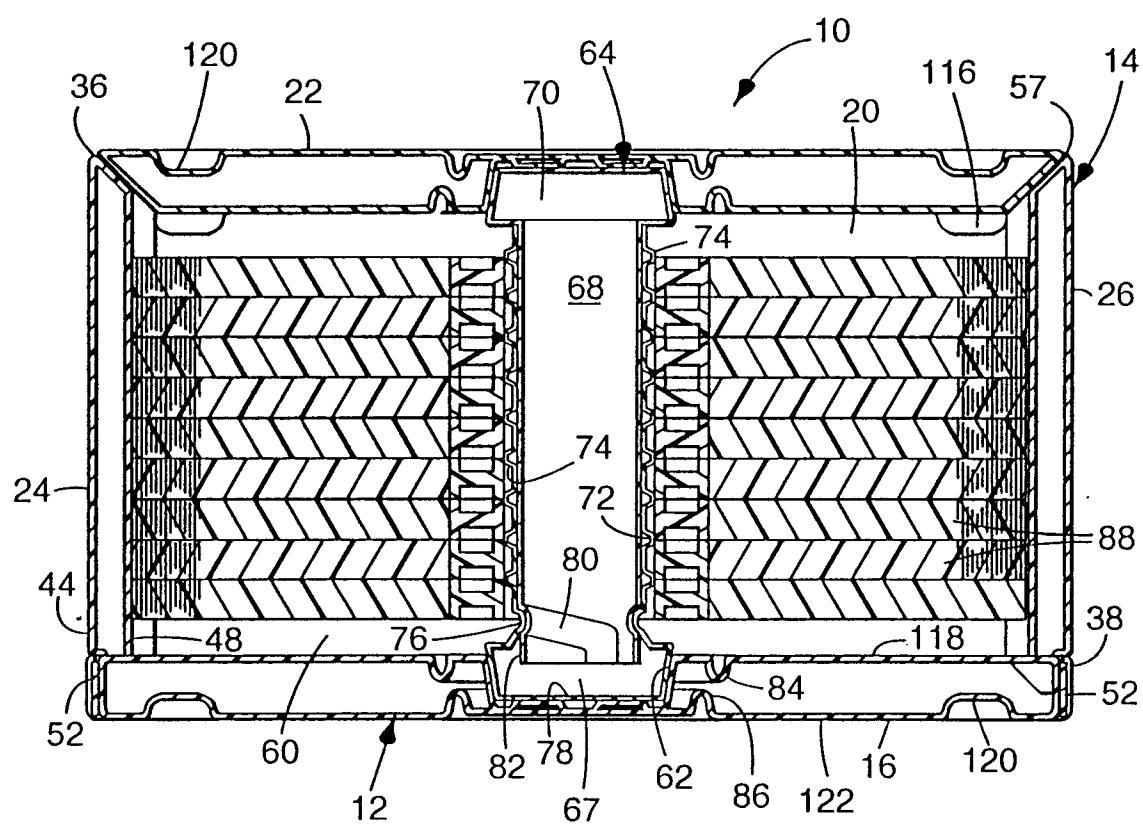


Fig. 6

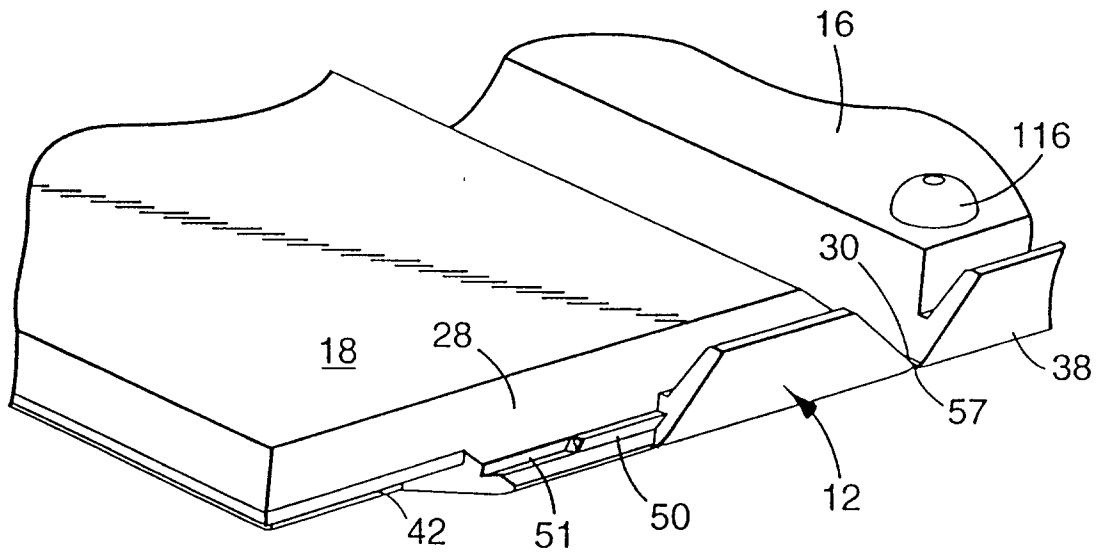


Fig. 7

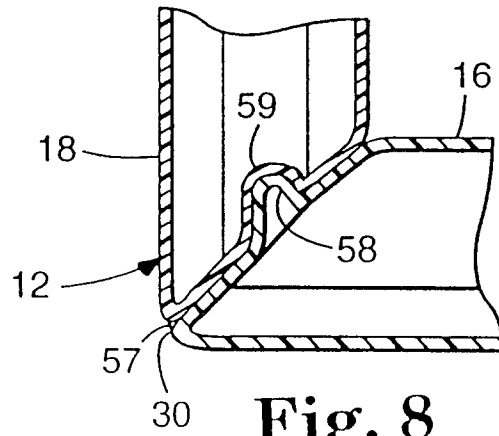


Fig. 8

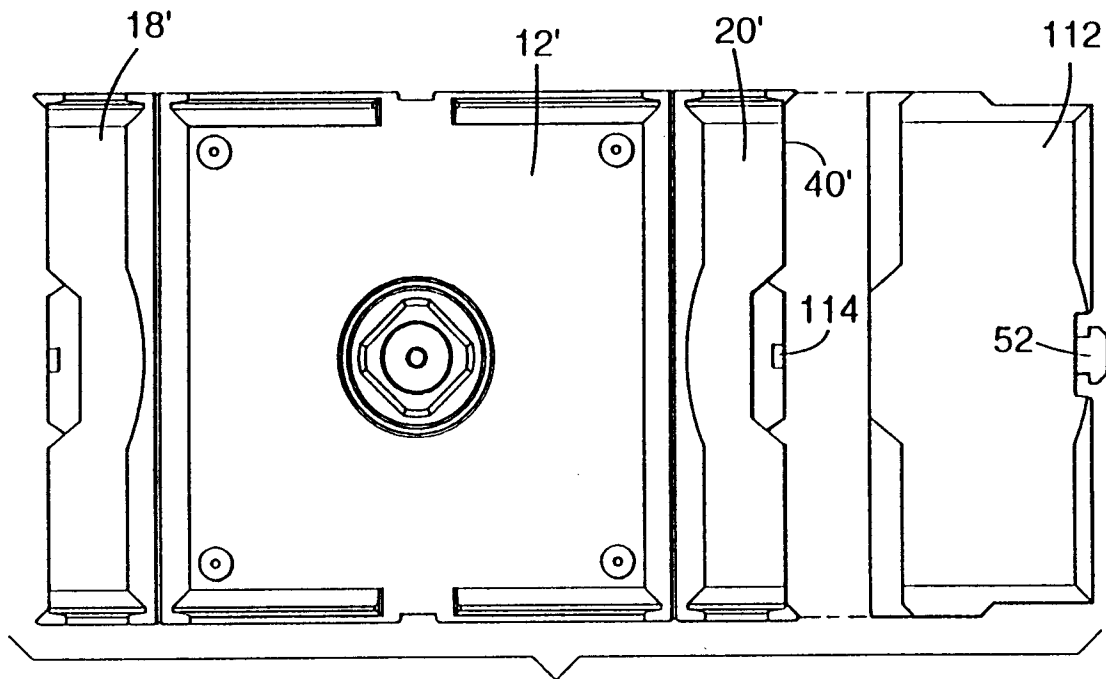


Fig. 9A

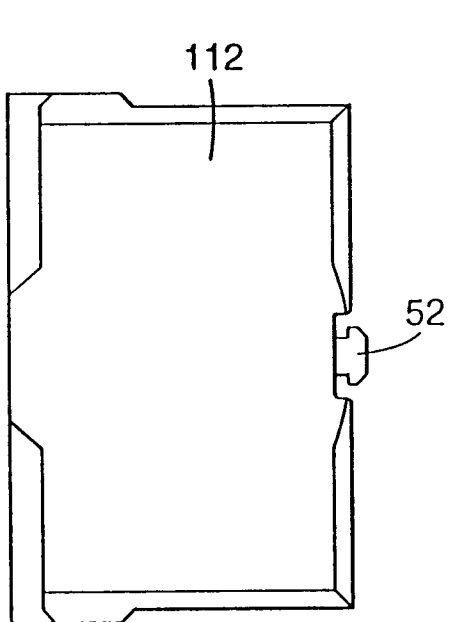


Fig. 9B

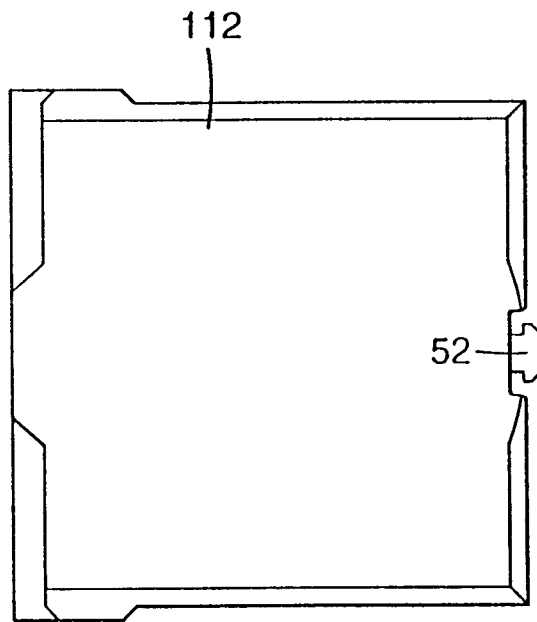
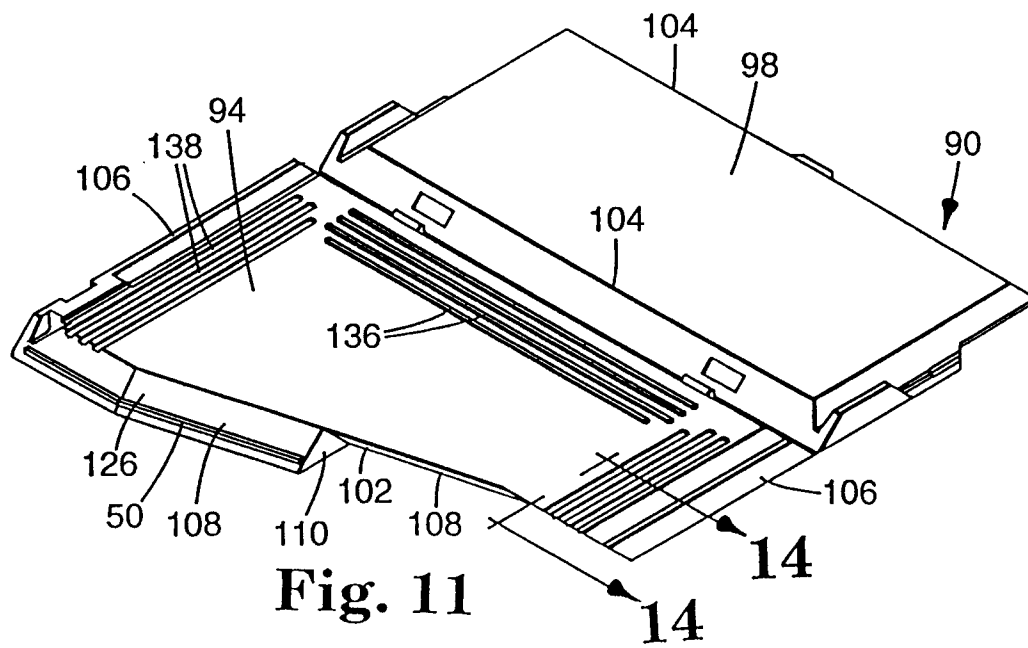
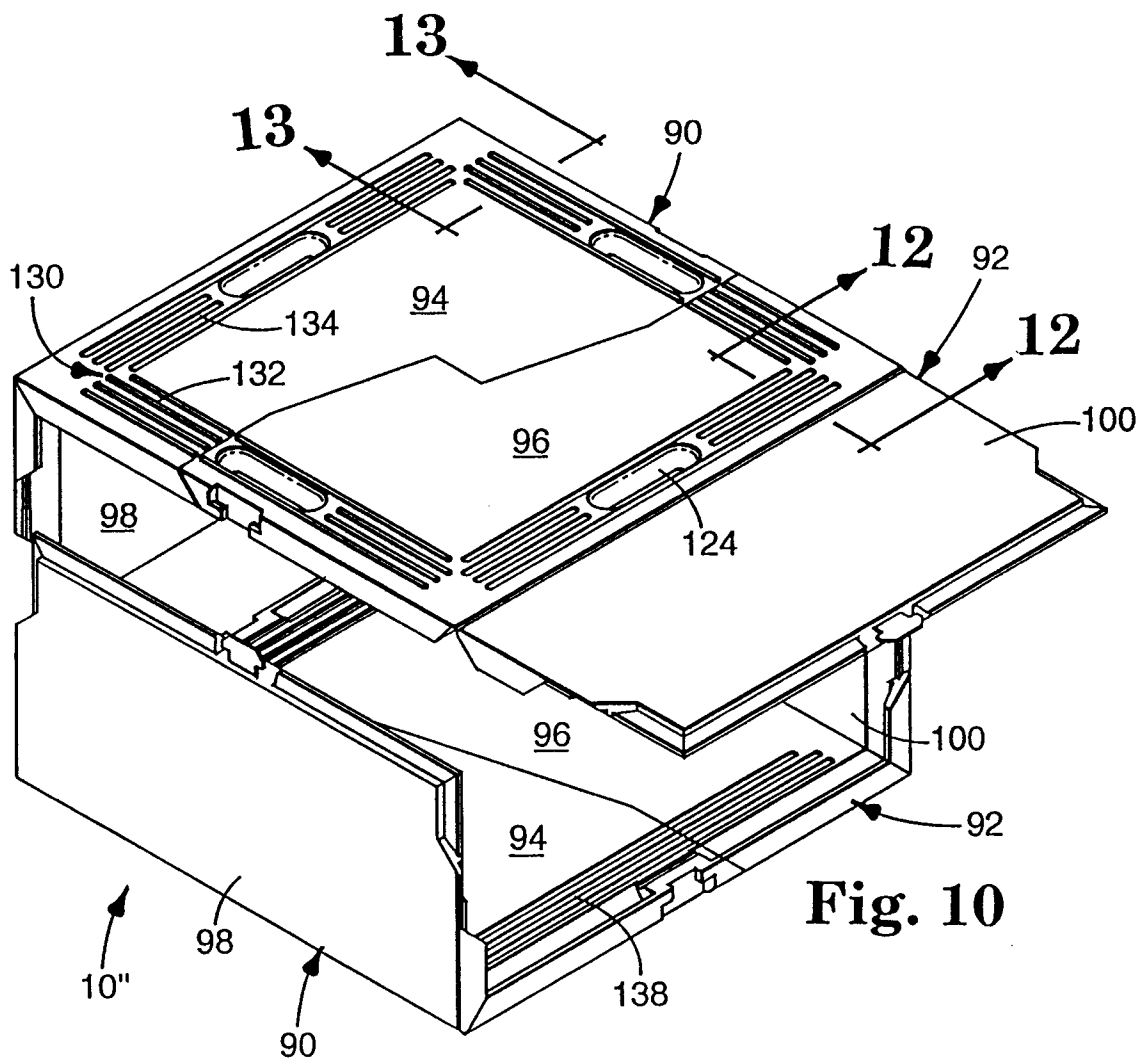


Fig. 9C



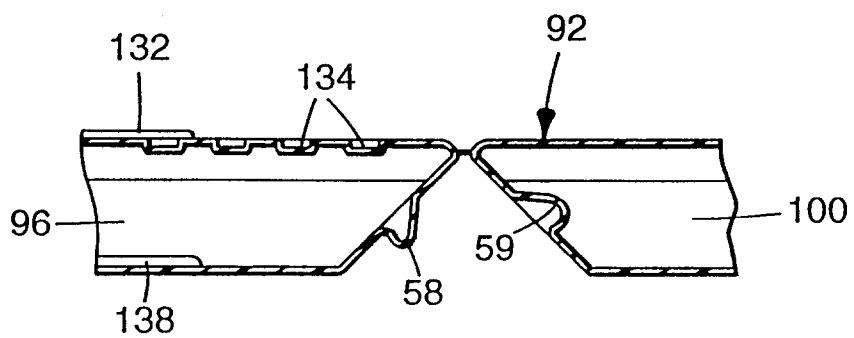


Fig. 12

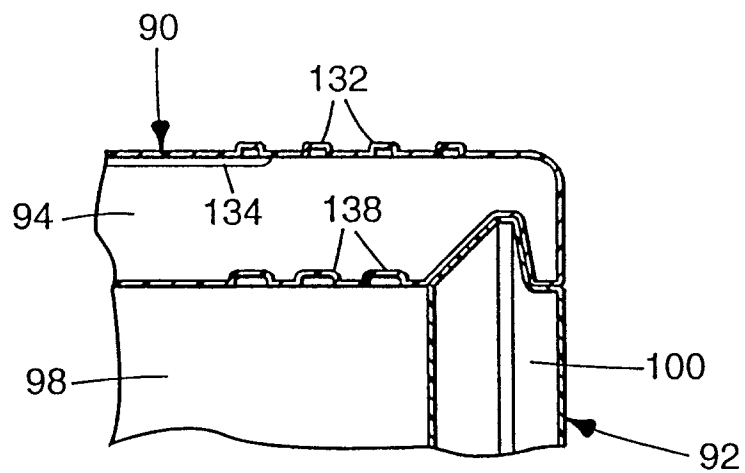


Fig. 13

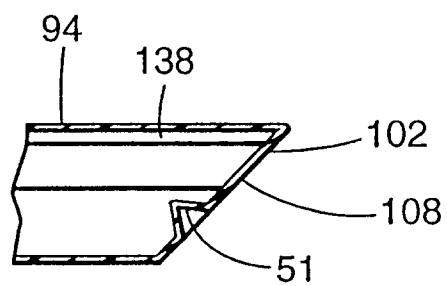


Fig. 14